AMENDMENTS AND LISTING OF CLAIMS

1. (Previously presented): A method for adjusting static attitude of a head suspension, comprising the step of

scanning at least one line continuously across at least a predetermined region of the head suspension with a laser to impart heat to the region to selectively adjust at least one of pitch and roll static attitude of the head suspension using an amount of scanning necessary to compensate for at least one of a pitch error and a roll error based on stored data from a prior measurement of at least one of the pitch and roll errors in a suspension of the type then being scanned.

2. (Cancelled)

3. (Previously presented): The method of claim 1, wherein the step of scanning the head suspension includes scanning a first scan region in a first spring arm of a flexure of the head suspension.

4. (Original): The method of claim 3, further including the step of scanning a second scan region of the head suspension with the laser beam to impart heat energy to the second scan region.

5. (Original): The method of claim 4, wherein the scan region is located in a second spring arm of the head suspension flexure.

6. (Original): The method of claim 5, wherein the step of scanning the first and second scan regions with a laser beam includes scanning a plurality of lines in the first and second scan regions.

7. (Original): The method of claim 6, wherein each of the plurality of lines scanned in the first and second scan regions extend substantially across the width of the first and second spring arms, respectively, the plurality of lines being substantially parallel to a transverse axis of the head suspension, the scanning of the plurality of lines causing the

spring arms to warp by an angular amount about the transverse axis at the first and second scan regions.

8. (Original): The method of claim 7, wherein the first scan region and the second scan region are located in a top surface of the flexure spring arms.

9. (Original): The method of claim 7, wherein the first scan region and the second scan region are located in a bottom surface of the flexure spring arms.

10. (Original): The method of claim 7, wherein the first scan region is located in a first surface of the flexure at the first spring arm, and wherein the second scan region is located in a second surface of the flexure that is opposite the first surface of the flexure at the second spring arm.

11. (Previously presented): The method of claim 1, wherein the step of scanning the head suspension includes scanning a first scan region located in a cross piece at the distal end of a head suspension flexure, the first scan region being adjacent and spaced apart in a first direction from a longitudinal axis of the head suspension.

12. (Original): The method of claim 11, further including the step of scanning a second scan region located in the cross piece of the flexure with the laser beam, the second scan region being adjacent and spaced apart in a second direction that is opposite the first direction from the longitudinal axis of the head suspension.

13. (Original): The method of claim 12, wherein the step of scanning the first and second scan regions with the laser beam includes scanning a plurality of lines in the first and second scan regions.

14. (Original): The method of claim 13, wherein each of the plurality of lines substantially extend across the width of the cross piece, each of the plurality of lines being substantially parallel to the longitudinal axis of the head suspension, the scanning of the plurality of lines causing the cross piece to warp by an angular amount about the longitudinal axis at the first and second scan regions.

15. (Original): The method of claim 14, wherein the first scan region is located on a first surface of the cross piece and the second scan region is located on a second surface that is opposite the first surface of the flexure.

16. (Original): The method of claim 14, further including the steps of:

scanning a plurality of lines in a third scan region of the head suspension, the third scan region located in a first spring arm of the head suspension flexure; and

scanning a plurality of lines in a fourth scan region of the head suspension, the fourth scan region located in a second spring arm of the head suspension flexure;

wherein the plurality of lines scanned in the third and fourth scan regions are scanned substantially across the width of the first and second spring arms, the plurality of lines scanned in the third and fourth scan regions being parallel to a transverse axis of the head suspension, the scanning of the plurality of lines in the third and fourth scan regions causing the third and fourth scan regions to warp by an angular amount about the transverse axis of the head suspension.

17. (Original): The method of claim 1, wherein the step of scanning the head suspension includes controllably scanning the head suspension to effect a desired amount of static attitude correction.

18. (Original): The method of claim 17, wherein the step of controllably scanning the head suspension includes determining the amount of scanning necessary to effect a desired angular deflection from stored data describing the relationship between angular deflection and the amount of scanning performed.

19. (Previously presented): The method of claim 18, wherein the relationship between the angular deflection and the amount of scanning is determined as a function of a number of scan lines scanned in the head suspension.

20. (Previously presented): A method for providing a precise adjustment to the static attitude of a head suspension, comprising the steps of:

determining an amount of scanning necessary to compensate for at least a portion of one of a pitch error and a roll error from a previously developed set of data for at least one of the pitch and roll errors;

performing a coarse static attitude adjustment to the head suspension, including a first step of scanning at least one line continuously across at least a scan region of the head suspension with a laser beam to warp the scan region;

measuring the static attitude of the head suspension after the coarse static attitude adjustment; and

performing a fine static attitude adjustment to the head suspension, including a second step of scanning at least one line continuously across at least the scan region of the head suspension a second time with the laser beam, fine static attitude adjustment causing the scan region to warp an additional amount that is less than the amount of warp caused by the coarse static attitude adjustment.

21. (Previously presented): The method of claim 20, wherein the first step of scanning comprises scanning a first plurality of scan lines in the scan region, and the second step of scanning comprises scanning a second plurality of scan lines in the scan region.

22. (Previously presented): The method of claim 21, wherein the step of predicting the amount of scanning necessary includes predicting a number of scan lines to compensate for at least a portion of at least one of the pitch and roll errors and further includes:

determining the pitch error between a desired pitch static attitude and the measured pitch static attitude of the head suspension;

determining the roll error between the desired roll static attitude and the measured roll static attitude of the head suspension;

determining the location of at least one scan region on the head suspension to compensate for at least a portion of at least one of the pitch error and roll errors.

23. (Previously presented): The method of claim 22, wherein the step of predicting the number of scan lines necessary to compensate for at least a portion of at least one of the pitch error and the roll errors comprises calculating the number of scan lines from at least one set of stored data depicting coarse static attitude adjustment as a function of the number of scan lines for the at least one of the pitch error and the roll errors.

24. (Original): The method of claim 23, wherein the portion of the one of the pitch and roll errors comprises greater than about eighty percent of the total one of the pitch and roll error between the desired static attitude and the measured static attitude.

25. (Original): The method of claim 24, wherein the step of performing the coarse static attitude adjustment further includes predicting the number of scan lines necessary to compensate for a portion of the other of the pitch error and the roll error.

26. (Original): The method of claim 25, wherein the step of predicting the number of scan lines necessary to compensate for a portion of the other one of the pitch error and the roll error comprises calculating the number of scan lines from at least one response curve depicting coarse static attitude adjustment as a function of the number of scan lines for the other one of the pitch error and the roll error.

27. (Original): The method of claim 26, wherein the portion of the other of the pitch error and the roll error comprises greater than about eighty percent of the total other of the pitch error and the roll error between the desired static attitude and the measured static attitude.

28. (Original): The method of claim 21, wherein the step of performing a fine static attitude adjustment further includes the steps of:

determining the pitch error between a desired pitch static attitude and the measured pitch static attitude provided by the head suspension after the coarse static attitude adjustment;

determining the roll error between a desired roll static attitude and the measured roll static attitude provided by the head suspension after the coarse static attitude adjustment; and

predicting the number of the second plurality of scan lines necessary to compensate for one of the pitch error and the roll error.

29. (Previously presented): The method of claim 28, wherein the step of predicting the amount of scanning necessary to compensate for one of the pitch error and the roll error comprises calculating the number of the second plurality of scan lines from at least one response curve depicting fine static attitude adjustment as a function of the number of scan lines for the one of the pitch error and the roll error.

30. (Original): The method of claim 29, wherein the step of performing the fine static attitude adjustment further includes predicting the number of scan lines necessary to compensate for the other of the pitch error and roll error.

31. (Original): The method of claim 30, wherein the step of predicting the number of scan lines necessary to compensate for the other of the pitch error and the roll error comprises calculating the number of scan lines from at least one response curve depicting fine static attitude adjustment as a function of the number of scan lines for the other of the pitch error and the roll error.

32. (Previously presented): The method of claim 21, wherein:

the step of performing a coarse static attitude adjustment further includes the steps of:

determining the pitch error between a desired pitch static attitude and the measured pitch static attitude of the head suspension,

determining the roll error between the desired roll static attitude and the measured roll static attitude of the head suspension,

determining the location of at least one scan region on the head suspension to compensate for one of the pitch error and roll error, and

predicting the number the first plurality of scan lines necessary to compensate for a portion of the one of the pitch error and roll error; and

the step of performing a fine static attitude adjustment further includes the steps of:

determining the pitch error between a desired pitch static attitude and the measured pitch static attitude provided by the head suspension after the coarse static attitude adjustment;

determining the roll error between a desired roll static attitude and the measured roll static attitude provided by the head suspension after the coarse static attitude adjustment; and

predicting a number of scan lines for the second plurality of scan lines necessary to compensate for one of the pitch error and the roll error.

33. (Original): The method of claim 32, further including the steps of:

calculating a response factor prior to performing the fine static attitude adjust, the response factor comprising a ratio between the estimated angular deflection for the coarse static attitude adjustment and the measured angular deflection for the coarse static attitude adjustment; and

adjusting the number of scan lines for the fine static attitude adjustment consistent with the response factor.

34. (Previously presented): A method for precisely micro-warping a region of metal to adjust static attitude of a disk drive head suspension, including the steps of

predicting an amount of scanning necessary to compensate for at least one static attitude error from a set of stored data based on a prior measurement of at least one static attitude error; and

controllably scanning a laser beam continuously along at least one line across the metal region to bend the metal region by an amount which causes the suspension to have a desired static attitude.

35. (Previously presented): The method of claim 34 wherein:

the method includes measuring static attitude of the suspension; and

controllably scanning the laser beam includes scanning the laser beam across the metal region until the measured static attitude corresponds to the desired static attitude of the suspension.

36. (Previously presented): The method of claim 35 wherein:

the method further includes:

providing scan number/static attitude change information describing a relationship between number of scans and static attitude changes; and

determining the number of scans which will cause the suspension to have the desired static attitude as a function of the measurement and the scan number/ static attitude change information; and

controllably scanning the laser beam includes scanning the laser beam across the metal region the determined number of times.

37. (Previously presented): The method of claim 34 wherein controllably scanning the laser beam includes controlling the number of scans.

38. (Previously presented): The method of claim 37 wherein controllably scanning the laser beam includes controlling the location of the scans.

39. (Previously presented): The method of claim 34 wherein controllably scanning the laser beam includes controlling the location of the scans.

40. (Previously presented): The method of claim 39 wherein controlling the location of the scans includes controlling a surface of the metal region which is scanned.

41. (Previously presented): The method of claim 34 for micro-warping a radius spring region of a suspension.

42. (Previously presented): The method of claim 34 for micro-warping flexure spring arms of a suspension.

43. (Previously presented): The method of claim 1 wherein the set of stored data is experimentally determined and stored for later reference as the amount of scanning that needs to be performed to effect a desired deflection.

44. (Previously presented): The method of claim 1 wherein when processing a large number of head suspensions, a set of stored data is experimentally determined for a first few head suspensions, and stored for later reference as the amount of scanning that needs to be performed for at least one of the pitch error and roll error for the remaining head suspensions without requiring a measurement step on the remaining head suspensions.

45. (Previously presented): The method of claim 34 wherein the set of stored data is experimentally determined and stored for later reference as the amount of scanning that needs to be performed to bend the metal region by an amount which causes the suspension to have the desired static attitude.

46. (Previously presented): The method of claim 34 wherein when processing a large number of head suspensions, the set of stored data is experimentally determined for a first few head suspensions, and stored for later reference as the amount of scanning that needs to be performed to bend the metal region by an amount which causes the suspension to have the desired static attitude for the remaining head suspensions without requiring a measurement step on the remaining head suspensions.

47. (New) A method of measuring and adjusting the static attitude of a head suspension of the type for use in a dynamic storage device, the method comprising the steps of:

providing a head suspension including:

a flexure comprising first and second gimbal arms positioned at a distal end of the flexure and connected to a slider mounting tongue, the slider mounting tongue having a static attitude;

a load beam supporting the flexure and having a mounting region at a proximal end, a rigid region distally spaced from the mounting region, and a spring region between the mounting region and the rigid region;

determining the planar orientation of a surface that is indicative of the static attitude of the slider mounting tongue; and

controllably permanently deforming a single gimbal arm of the flexure thereby adjusting the static attitude of the slider mounting tongue.

48. (New) The method of claim 47, wherein the surface that is indicative of the static attitude of the slider mounting tongue is a surface of the slider mounting tongue of the head suspension being measured and adjusted.

49. (New) The method of claim 47, wherein the step of determining the planar orientation of a surface that is indicative of the static attitude of the slider mounting tongue includes measuring the planar orientation of the surface with an optical measurement technique.

50. (New) The method of claim 49, wherein the optical measurement technique utilizes an autocollimator.

51. (New) The method of claim 50, wherein the autocollimator utilizes laser light.

52. (New) The method of claim 47, further including the step of controllably permanently deforming an additional gimbal arm of the flexure after the step of controllably permanently deforming a single gimbal arm of the flexure.

53. (New) The method of claim 47, further including the step of determining the planar orientation of a reference surface in addition to determining the static attitude of the slider mounting tongue before the step of controllably permanently deforming a single gimbal arm of the flexure.

54. (New) The method of claim 53, wherein the steps of determining the static attitude of the slider mounting tongue and of determining the planar orientation of the reference surface are conducted on a head suspension in its free state without being subject to an external loading force.

55. (New) The method of claim 47, wherein the step of determining the static attitude of the slider mounting tongue is conducted on a head suspension in a loaded state with a portion of the head suspension subject to an external loading force.

56. (New) The method of claim 47, further including the step of operatively supporting the head suspension with a workpiece holder before the step of determining the planar orientation of the surface.

57. (New) The method of claim 56, wherein the step of operatively supporting the head suspension includes supporting the load beam of the suspension with the workpiece holder.

58. (New) The method of claim 57, wherein the step of operatively supporting the head suspension further includes securing the head suspension to the workpiece holder with a force of differential pressure.

59. (New) A method of measuring and adjusting the static attitude of a head suspension of the type for use in a dynamic storage device, the method comprising the steps of:

providing a head suspension including:

a flexure comprising first and second gimbal arms positioned at a distal end of the flexure and connected to a slider mounting tongue, the slider mounting tongue having a static attitude;

a load beam supporting the flexure and having a mounting region at a proximal end, a rigid region distally spaced from the mounting region, and

a spring region between the mounting region and the rigid region;

determining the planar orientation of a surface that is indicative of static attitude of the slider mounting tongue; and

independently controllably permanently deforming the first gimbal arm and the second gimbal arm of the flexure thereby adjusting the static attitude of the slider mounting tongue.

60. (New) The method of claim 59, wherein the gimbal arms are simultaneously but independently controllably permanently deformed for adjusting the static attitude of the slider mounting tongue.

61. (New) The method of claim 59, wherein the gimbal arms are independently controllably permanently deformed one after the other for adjusting the static attitude of the slider mounting tongue.

62. (New) The method of claim 59, wherein the surface that is indicative of the static attitude of the slider mounting tongue is a surface of the slider mounting tongue of the head suspension being measured and adjusted.

63. (New) The method of claim 59, wherein the step of determining the planar orientation of a surface that is indicative of the static attitude of the slider mounting tongue includes measuring the planar orientation of the surface with an optical measurement technique.